

What is claimed is:

1. An image recognition apparatus comprising:
a transparent substrate having four sides;
5 a plurality of gate lines disposed on the transparent substrate and spaced apart from each other in a predetermined distance, the gate lines having a predetermined slope such that the gate lines intersect with two sides of the four sides, which are adjacent to or facing each other;

10 a plurality of sensing signal output lines disposed on the transparent substrate, spaced apart from each other in a predetermined distance and substantially perpendicular to the gate lines; and

15 an image recognition sensor disposed on a pixel area, the image recognition sensor sensing an image pattern of an object in response to a gate on/off signal applied through the gate lines so as to output an image recognition signal to the sensing signal output lines.

2. The apparatus of claim 1, wherein the predetermined slope is from about 22.5 to about 45 degrees.

3. The apparatus of claim 1, wherein the image recognition sensor comprises a
20 photoelectric sensor.

4. The apparatus of claim 3, wherein the image recognition sensor comprises:
a first TFT connected to a gate line adjacent thereto, the first TFT sensing the image pattern corresponding to a reflecting light reflected from the object;

25 a storage capacitor that charges an electron charge corresponding to the image

pattern from the first TFT; and

a second TFT connected to the gate line adjacent thereto, the second TFT outputting a voltage signal as the image recognition signal corresponding to the electron charge charged into the storage capacitor to a sensing signal output line adjacent thereto.

5

5. The apparatus of claim 1, wherein the image recognition sensor comprises a capacitance type image recognition sensor that senses the image pattern using a capacitance variation between the object and the image recognition sensor.

10

6. The apparatus of claim 5, wherein the image recognition sensor comprises:
a first TFT connected to a gate line adjacent thereto;
a conductive sensing electrode that charges an electron charge corresponding to a distance variation between the object and the image recognition sensor in response to the first TFT turned on; and
15 a second TFT that outputs a voltage signal as the image recognition signal corresponding to the electron charge charged into the conductive sensing electrode to a sensing signal output line adjacent thereto.

15

7. The apparatus of claim 1, wherein the object is a human being and the image pattern is obtained from a human finger of the human being.

20

8. An image recognition apparatus comprising:
a transparent substrate having four sides;
a plurality of gate lines disposed on the transparent substrate and spaced apart from each other in a predetermined distance, the gate lines having a predetermined slope such

that the gate lines intersect with two sides of the four sides, which are adjacent to or facing each other;

a plurality of sensing signal output lines disposed on the transparent substrate, spaced apart from each other in a predetermined distance and substantially perpendicular to
5 the gate lines; and

an image recognition sensor disposed on a pixel area, responsive to a gate on/off signal applied through the gate lines, the image recognition sensor sensing an image pattern of an object and outputting an image recognition signal to the sensing signal output lines, which is corresponding to a reflecting light reflected from the image pattern printed on the
10 object.

9. The apparatus of claim 8, wherein the predetermined slope is from about 22.5 to about 45 degrees.

15 10. The apparatus of claim 8, wherein the image recognition sensor comprises:
a first TFT connected to a gate line adjacent thereto, the first TFT sensing the image pattern in response to the reflecting light reflected from the object;

a storage capacitor that charges an electron charge corresponding to the image pattern from the first TFT; and

20 a second TFT connected to the gate line adjacent thereto, the second TFT outputting a voltage signal as the image recognition signal corresponding to the electron charge charged into the storage capacitor to a sensing signal output line adjacent thereto.

25 11. The apparatus of claim 8, wherein the object is a human being and the image pattern is obtained from a human finger of the human being.

12. An image recognition apparatus comprising:

a transparent substrate having four sides;

a plurality of gate lines disposed on the transparent substrate and spaced apart from each other in a predetermined distance, the gate lines having a predetermined slope such that the gate lines intersect with two sides of the four sides, which are adjacent to or facing each other;

5 a plurality of sensing signal output lines disposed on the transparent substrate, spaced apart from each other in a predetermined distance and substantially perpendicular to the gate lines; and

10 an image recognition sensor disposed on a pixel area, the image recognition sensor sensing an image pattern of an object and outputting an image recognition signal to the sensing signal output lines, which is corresponding to a distance variation between an object and the image recognition sensor.

15

13. The apparatus of claim 12, wherein the predetermined slope is from about 22.5 to about 45 degrees.

14. The apparatus of claim 12, wherein the image recognition sensor comprises:

20 a first TFT connected to a gate line adjacent thereto;

a conductive sensing electrode that charges an electron charge corresponding to the distance variation between the object and the image recognition sensor; and

25 a second TFT that outputs a voltage signal as the image recognition signal corresponding to the electron charge charged into the conductive sensing electrode to a sensing signal output line adjacent thereto.

15. The apparatus of claim 12, wherein the object is a human being and the image pattern is obtained from a human finger of the human being.

5 16. An LCD apparatus comprising:
an LCD panel that displays an image;
an image recognition part including a first transparent substrate having four sides, a plurality of gate lines spaced apart from each other in a predetermined distance, the gate lines having a predetermined slope such that the gate lines intersect with two sides of the four
10 sides, which are adjacent to or facing each other, a plurality of sensing signal output lines spaced apart from each other in a predetermined distance and substantially perpendicular to the gate lines, and an image recognition sensor disposed on a pixel area, the image recognition sensor sensing an image pattern of an object in response to a gate on/off signal applied through the gate lines so as to output an image recognition signal to the sensing
15 signal output lines; and

a backlight assembly disposed under the LCD panel, the backlight assembly supplying a light to the LCD panel and the image recognition part.

20 17. The LCD apparatus of claim 16, wherein the predetermined slope is from about 22.5 to about 45 degrees.

25 18. The LCD apparatus of claim 16, wherein the image recognition sensor comprises a photoelectric sensor that senses the image pattern using a reflecting light reflected from the object or a capacitance type image recognition sensor that senses the image pattern using a capacitance variation between the object and the image recognition

sensor.

19. The LCD apparatus of claim 16, wherein the LCD panel comprises;

a second transparent substrate;

5 a plurality of gate lines disposed on the second transparent substrate; and

a plurality of data lines disposed on the second transparent substrate and substantially perpendicular to the gate lines,

wherein the gate and data lines are inclined in the predetermined slope with respect to the gate lines and sensing signal output lines disposed on the first transparent substrate.

10

20. The LCD apparatus of claim 16, wherein the object is a human being and the image pattern is obtained from a human finger of the human being.